FIRST ASTRONOMICAL OBSERVATION OF VIBRATIONALLY HOT AMINOACETONITRILE ASSISTED BY SYNCHROTRON-BASED FT-IR SPECTROSCOPY

MATTIA MELOSSO, *Dept. Chemistry "Giacomo Ciamician", University of Bologna, Bologna, ITALY*; ARNAUD BELLOCHE, *Millimeter- und Submillimeter-Astronomie, Max-Planck-Institut für Radioastronomie, Bonn, NRW, Germany*; LUCA DORE, *Dept. Chemistry "Giacomo Ciamician", University of Bologna, Bologna, ITALY*; FILIPPO TAMASSIA, *Dipartimento di Chimica Industriale "Toso Montanari", Università di Bologna, Bologna, Italy*; MARIE-ALINE MARTIN-DRUMEL, *CNRS, Institut des Sciences Moleculaires d'Orsay, Orsay, France*; OLIVIER PIRALI, *Institut des Sciences Moléculaires d'Orsay, Université Paris-Sud, Orsay, France*; CRISTINA PUZZARINI, *Dep. Chemistry 'Giacomo Ciamician', University of Bologna, Bologna, Italy*.

Experimental and theoretical studies have shown that glycine (NH_2CH_2COOH) and other simple amino acids can be formed in cold astronomical objects of the interstellar medium (ISM). However, the astronomical identification of amino acids in the ISM still represents a great challenge and it is equally important to detect possible precursors of interstellar glycine. Aminoacetonitrile (NH_2CH_2CN), an intermediate product in the Strecker synthesis of glycine, is considered to be one of the most important prebiotic molecules. Recently, aminoacetonitrile has been detected in Sagittarius B2 (Sgr B2) thanks to astronomical observations at millimeter-wavelengths. Motivated by this detection and its astrochemical importance, we have investigated the ro-vibrational spectrum of aminoacetonitrile in the far-infrared region. The measurements have been carried out at the AILES beamline of the synchrotron SOLEIL with a Fourier transform infrared spectrometer. Some low-lying excited states have been detected through the corresponding fundamental bands, whose analysis led to precise vibrational energies. Successively, we have used the new spectral line survey ReMoCA, performed toward Sgr B2(N) with ALMA, to search for NH_2CH_2CN signatures. We detected several tens of rotational lines belonging to the ground and two excited states of aminoacetonitrile. By combining the new laboratory data with the astronomical observations, an accurate value of the column density of aminoacetonitrile could be derived.